**International Journal of Animal Biology**
Vol. 1, No. 5, 2015, pp. 176-181
http://www.aiscience.org/journal/ijab

# Prevalence of Endoparasites of *Synodontis shcall* and *Synodontis ocellifer* (Upside-Down Cat Fish) from Lower River Benue, Nigeria

**S. Omeji[1, *], R. A. Obande[2], S. T. Member[1]**

[1]Department of Fisheries and Aquaculture, University of Agriculture, Makurdi, Benue State, Nigeria
[2]Department of Fisheries Technology, Federal College of Freshwater Fisheries Technology, Baga, Maiduguri, Borno State, Nigeria

## Abstract

Endoparasites of *Synodontis shcall* and *Synodontis ocellifer* (Upside-down cat fish) from Lower River Benue were investigated. Four parasites (Eustrongylides sp, Procamallanus sp, Microsporidian sp and *Diphilobotrium latum*) were recovered from the stomach and intestine of the sampled fish species. Of the 658 identified from the two species of synodontis used for the study, Nematodes accounted for 48.48%, cestode (25.53%) and protozoa (25.99%). There was no significant difference ($p>0.05$) in the parasite load between the two species of fish. It was observed that the intestine of the sampled fish had higher percentage parasite load than the stomach. The females of both fish species had higher parasitic prevalence (52.22% and 53.27%) than the males (47.77% and 46.27%) respectively. Highest percentage parasite infestations of 73.52% for *S. Schall* and 54.60% for *S. Ocellifer* were recorded in the length group between 28.1-38.0cm while the least (1.87% and 6.53% were recorded in the length group between 38.1-48.0cm for both species respectively. Variations in parasite loads existed among the weight ranges of the fish species.

## Keywords

Endoparasites, *Synodontis shcall*, *Synodontis ocellifer,* Lower River Benue

Received: May 27, 2015 / Accepted: June 6, 2015 / Published online: July 20, 2015



## 1. Introduction

Parasites represent one of the most hazardous threats to fish health; they attack the fish and cause massive destruction of the skin as well as other parts of the body thereby increasing their susceptibility to secondary infections, which could result in the nutritive devaluation of fish and subsequent economic loss (Onyedineke *et al.,* 2010 Sterud *et al* 2003). Also, parasites compete for food with the host fish, thereby depriving them of essential nutrients and inhibiting their growth leading to morbidity.

Parasitic diseases of fish are very common all over the world and are of peculiar importance in the tropics (Roberts and Janvoy, 2002) but in spite of increasing demands on fishes, not much attention is found on fish health situation like other livestock animals. Of all the vertebrates, fish is one of the most parasitized and the importance of parasitic infection on fish production has largely remained an issue of concern to fish farming. Considering the abundance and economic importance of Synodontis species in the catches of fishes of River Benue, and the dearth of information on the parasites of this species from Lower River Benue, this study aimed at identifying the common endo-parasites of the Genus synodontis (*Synodontis ocellifer* and *Synodontis schall*), comparing the parasite loads of the two speciesand determining the relationship between the parasites and total length, parasites and weight and sex of the sampled fishes. Baseline information on the availability of parasites and their site preferences in the Genus synodontis (*Synodontis ocellifer*

* Corresponding author
E-mail address: samuelomeji@yahoo.com (S. Omeji)

and *Synodontis schall*) from Lower River Benue formed additional rationale for this study.

# 2. Materials and Methods

## 2.1. Study Area

The study took place in Makurdi the capital of Benue State Nigeria located at Longitude 7°43°N and Latitude 8°32°E. Fig1. The town is divided into the North and the South bank by the River Benue. River Benue exists year round, the water volume fluctuates with season. The river overflow its bank during the rainy season (May-October) but decreases drastically in volume leaving tiny island in the middle of the river during the dry season (November-April). The river contains several species of fish which are of economic importance to the people of Benue State and Nigeria at large.

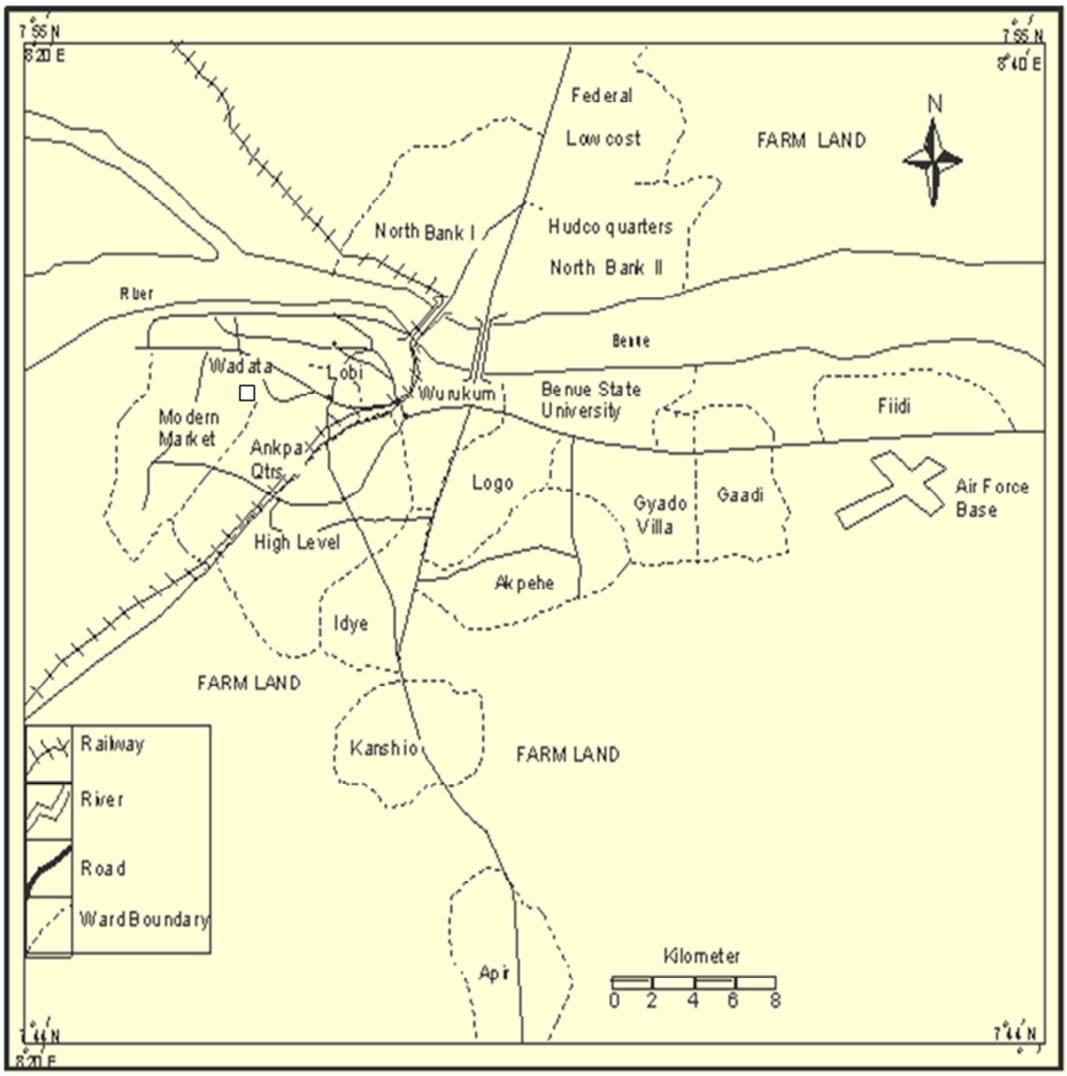


**Fig. 1.** Map of Makurdi, Benue State showing sampling site.

## 2.2. Sample Collection

A total of two hundred randomly selected fishes comprising of one hundred each of *S. schall* and *S. Ocellifer* of different sizes were bought from Wadata market. Twenty specimens each of the samples from the sampling site was collected monthly for a period of five months and transported fresh to the Fisheries laboratory, University of Agriculture, Makurdi in plastic jars.

## 2.3. Measurement of Lengths, Sex Determination and Identification of the Sampled Fish

The total and standard lengths of each fish was measured in centimetres (cm) using a meter rule, while the weight of each of the fish was taken in grams (g) using an electronic weighing balance and the sexes of the fish were determined by examination of their papillae.

### 2.4. Fish Examination and Parasites Collection

Examination of fish parasites was carried out using the techniques of Bich and Dawaki (2010), Omeji *et al* (2010), Akinsanya *et al* (2007), and Emere and Egbe (2006).

The stomach and intestine of each of the fish was dissected and the alimentary canals were removed and cut into parts in physiological saline (0.9ml) for parasite recovery.

The stomachs and intestines were further carefully split open longitudinally to aid the emergence of the parasites.

Contents of the stomachs and intestines were further washed into the Petri-dish containing the saline solution. One to two drops of the preparation were placed on slide covered with slips and observed at × 100 magnifications under phase-contrast microscope.

The recovered parasites were sorted out into groups and identified using taxonomic guides by Paperna (1996), counted and recorded.

### 2.5. Calculation of Prevalence and Mean Intensity

Parasitic prevalence and mean intensity were calculated using the formulae using according to Ezewanji, *et al.,* (2005) as thus;

$$\text{Prevalence \%} = \frac{\text{Numberoffish infected}}{\text{numberoffish examined}} \times 100 \quad (1)$$

$$\text{Mean Intensity} = \frac{\text{Total Number of Parasites}}{\text{Number of fish infested}} \quad (2)$$

### 2.6. Data Analysis

Data obtained was subjected to two way analysis of variance (ANOVA).

Chi – square was used to determine differences in parasite load between the sexes. Correlation matrix was used to determine the relationship between weight, length and the total number of parasites in the infested fishes using statistical methods according to social science software (SPSS, version 16.0).

## 3. Results

A total of 658 parasites were identified from the two species of synodontis used for the study. Nematodes accounted for 319 (48.48%), cestode168 (25.53%) and protozoa 171 (25.99%). While 337 (51.22%) parasites were recovered from 54 infested *S. schall*, 321 (48.78%) were recovered from 51 infested *S. ocellifer*. Of the 337 parasites recovered from *S. schall*, 150 (45.51%) were nematodes, 75 (22.26%) were cestode while 112 (33.23%) were protozoan. Out of the 321 parasites recovered from *S. ocellifer*, 169 (52.65%) of these parasites were Nematodes, 93 (28.97%) were cestodes and 59 (18.38%) were protozoans as shown in Table. There was no significant difference ($p>0.05$) in the parasite load between the two species of fish.

**Table 1.** Parasite taxonomic load in *s. Schall* and *s. Ocellifer* from river benue.

| Fish species | Nematodes | Cestode | Protozoa | Total |
|---|---|---|---|---|
| *S. Schall* | 150 (45.51%) | 75 (22.26%) | 112 (33.23%) | 337 (51.22%) |
| *S. Ocellifer* | 169 (52.65%) | 93 (28.97%) | 59 (18.38%) | 321 (48.78%) |
| Total | 319 (48.48%) | 168 (25.53%) | 171 (25.99%) | 658 |

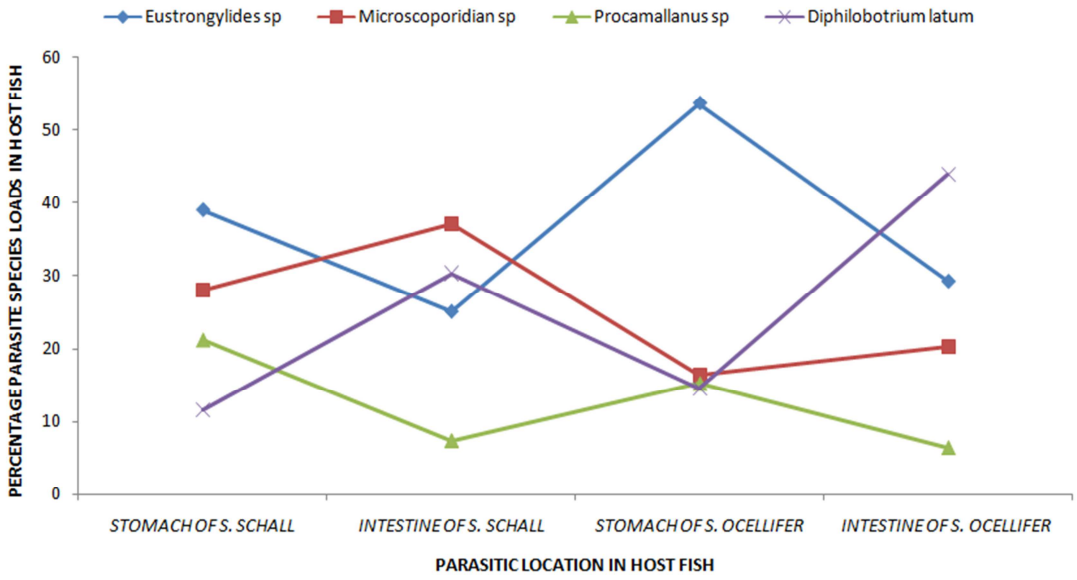


**Fig. 2.** Distribution, location and percentage parasite species in *S.schall*and *S. Ocellifer* from Lower River Benue.

Results of the distribution, location and percentage parasite species in *S. schall* and *S. Ocellifer* are as shown in Figure 2. Of the total parasites recovered from the stomach of *S. schall* and *S. ocellifer*. Eustrongylidesspp had the highest percentage number of parasite (39.04%) in the *S. schall* and (53.66%) in *S. ocellifer*. *D. latum* had the least (11.64%) and (14.63%) in *S. schall* and *S. Ocellifer* respectively. From the intestine of the two species of fish, microsporidiansp had the highest percentage number of parasite (37.17%) in *S schall* while *D. latum* had the highest (43.95%) in *S. ocellifer*. Procamallanussp had the least 7.33% in *S. schall* and 6.37% in *S. Ocellifer* respectively.

Results of the Relationship between sex and percentage parasite infestations in *S. schall* and *S. Ocellifer* are as shown in Figure 3.

Out of the 100 specimens of *S. schall*, 46% comprising of 20% male and 26% female were not affected while 54% comprising of 23% male and 31% female were affected with a total of 337 parasites. While male had 161 (47.77%) percentage number of parasite, female had 176 (52.22%). There was no significant difference ($p>0.05$) in the total number of parasite between the male and female (Chi square = 0.418). On the other, out of the 100 specimens of *S. ocellifer*, 49% comprising of 16% male and 33% female were not affected while 51% comprising of 25% male and 26% female were affected with a total of 321parasites. While male had 150 (46.73%) percentage number of parasite, female had 171 (53.27%). There was no significant difference ($p>0.05$) in the total number of parasite between the male and female (Chi square = 0.081).

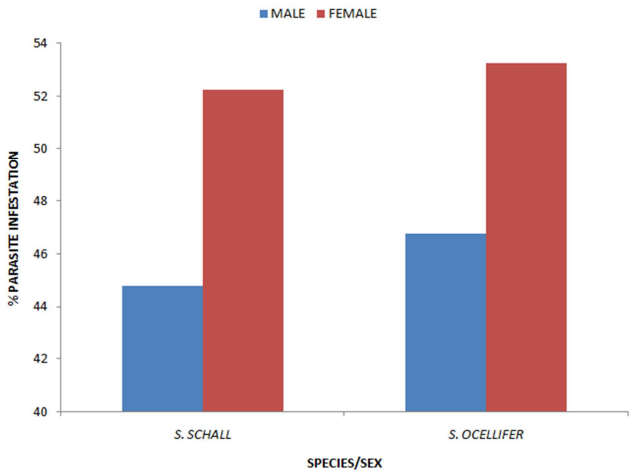


**Fig. 3.** Relationship between sex percentage parasite infestations in *S. schall* and *S. ocellifer.*

Results of the relationship between total length group and percentage parasite infestation in *S. schall* and *S. Ocellifer* are as shown in figure 4 while Figure 5 shows the results of the relationship between weight group and percentage parasite infestation in *S. schall* and *S. ocellifer*.

From the results of the relationship between length group and percentage parasite infestation in *S. schall* and *S. Ocellifer* (Fig. 4), the highest percentage parasite infestation (73.52%) for *S. schall* and (54.60%) for *S. Ocellifer* were recorded in the length group between 28.1-38cm while the least (1.87%) and (6.53%) were recorded in length group between 38.1-48cm for *S. schall* and *S.ocellifer* respectively. In length group 18-28cm, while *S. schall* had 24.61% parasite infestation, *S. Ocellifer* had 38.87%.

From the results of the relationship between weight group and percentage parasite infestation in *S. schall* and *S. Ocellifer* (Fig. 5), it was observed that the weight group (150.1g-300g) had the highest percentage parasite infestation (45.40%) and (70.40%) for *S. schall* and *S. Ocellifer*respectively. While the least (1.48% and 6.85%) were recorded in weight groups (450.1-600g and 300.1-450g) for *S. schall* and *S. Ocellifer* respectively.

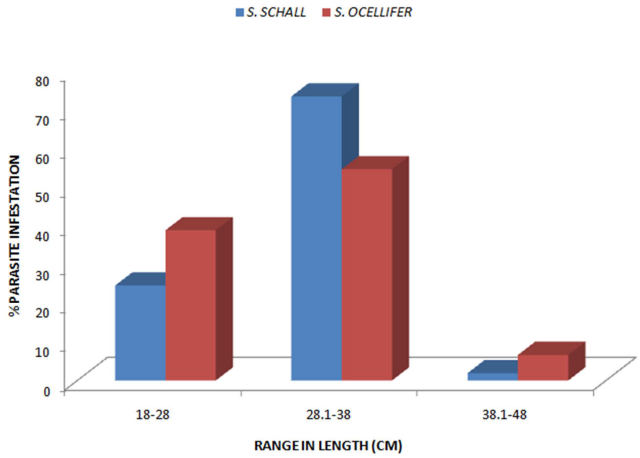


**Fig. 4.** Relationship between total length group and percentage parasite infestation in *S. schall* and *S. ocellifer.*

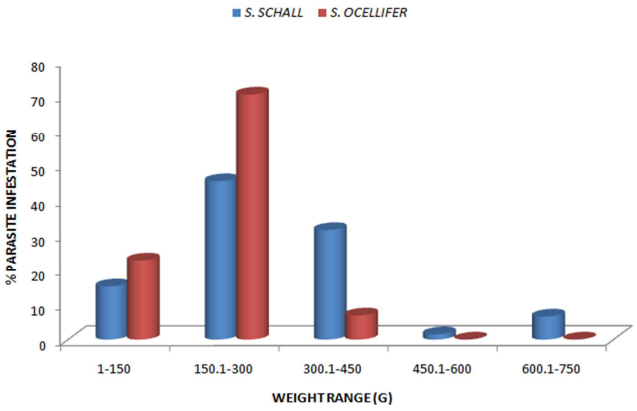


**Fig. 5.** Relationship between total weight group and percentage parasite infestation in *S. schall* and *S. ocellifer.*

Results of the correlation matrix for total number of parasites

found on *S. schall* and *S. ocellifer* are as shown in Table 2. There was a significant difference (P<0.05) between total length and total number of parasites, total length and weight and total number of parasites and weight of both species.

**Table 2.** Correlation matrix for total number of parasites found on *s. Schall* and *s. Ocellifer.*

| S. schall | | | | S. Ocellifer | | |
|---|---|---|---|---|---|---|
| | TL | TNP | WT | TL | TNP | WT |
| TL | 1.00 | | | 1.00 | | |
| TNP | 0.122** | 1.00 | | 0.575** | 1.00 | |
| WT | 0.875** | 0.181** | 1.00 | 0.881** | 0.486** | 1.00 |

**. Correlation is significant at the p<0.05 level (two tailed).

## 4. Discussion

Different parasites were observed and identified in the fishes used for this study. In the reported work of Paul and John (2002), it is common to find a fish harbouring several parasite infections rather than only one single parasite species. In this study, *S. schall* and *S. Ocellifer* were infected with Eustrongylides sp, microsporidian sp, procamallanus sp, *Diphyllobothrium latum*. Eustrogylides sp and procamallanus sp were recovered in the stomachs and intestine of the sampled species. According to Ekanem *et al*., (2011), Nematodes are known to occur in body cavities or found penetrating subcutaneous tissues. Host specificity of nematodes agrees with the findings of Akinsaya *et al*., (2007), Olurin and Somorin (2006). The occurrence of Eustrongylides sp and procamallanus sp in the intestine of the sampled species agrees with the reported work of Olurin *et al*., (2012) who reported a number of nematodes from the intestine of tilapia fish from River Osun.

Eustrongylides and Procamallanus sp were more in the stomach than the intestine while Microsporidian sp and *Diphyllobothrium latum* were more in the intestine than stomach of the sampled fish species. However, it was observed that the intestine had more parasite than the stomach.The presence of these parasites in the intestine than stomach might be due to the presence of digested food present there or due to greater surface area present in the intestine. Marcogliese (2002) reported that most parasites inhabit the intestine because of their general feeding habits.

It is not surprising to find Eustrongylides sp in the fish species in River Benue because of the presence of aquatic birds around the river. Saayman *et al*., (1991) reported that aquatic birds are important in the ecology of fish parasites because most helminthes complete their life cycles in the host birds.

Differences in the prevalence of endoparasites in male and femaleof *S. schall* and *S. ocellifer* could be as a result of their physiological state. According to Aloo *et al*., (2004), the main reason for the differences in parasitic load with sex is physiological. Emere and Egbe (2006) also stated that females are more susceptible to parasite infection during breeding seasons, that most gravid females could have had reduced resistance to infection by to infection by parasites. In addition their increased rate of food intake to meet requirements for the development of their egg might have exposed them to more contact with parasite which subsequently increased their chances of been infected. Omeji and *et al*., (2011) also made similar observations.

The higher number of parasites recorded with bigger fishes of *S. schall* and *S. Ocellifer* could be attributed to large amount of food intake by the fish. This agrees with the reported work of Ekanem *et al*., (2011) who recorded higher number of parasites in bigger synodontis sp as a result of the large amount of food taken by the fish. In addition, the higher number of parasites recorded in the bigger fish could be attributed to the fact that bigger fish covers wider area in search of food than the smaller ones as such are more prone to parasites than the smaller counterparts. Similar observation had been made by Omeji *et al*., (2010) and (2011).

The basic function of the immune system is to protect an organism against infection in other to minimize the fitness costs of being infected, Karoline *et al*., (2011). The higher rate of infection in the bigger fishes compared to the smaller counterparts could also be attributed to their low immune system.

## References


[1] Akinsanya B, Otubanjo O.A and Hassan A.A. (2007).Helminth parasites of *Malapterurus electricus* Malapteruridae from Lekki Lagoon, Lagos, *Nig. J. Am. Sci.* 3(3): 1-5.

[2] Aloo, P.A. Anam, R. O and Mwamgi, J.N. (2004). Metazoan parasites of some commercially important fish along the Kenyan coast. Western Indian ocean. Mar.Sci.3(1): 71-73

[3] Bichi, A. H. and Dawaki, S. S. (2010). A survey of ectoparasites on the gills, skin and fins of oreochromi niloticus at Bagauda Fish Farm, Kano, Nigeria. *Bayero Journal of Pure and Applied Sciences*, 3(1): 83 – 86.

[4] Ekanem A. PEyo V.O and Sampson A.F (2011) parasite of landed fish from great kwa River, calaber cross river state, Nigeria. *International journal of fisheries and aquaculture vol. 3(12).PP225-230.*www.academicjournals.org *IJFA.DOI:105897/IJFA 11.072.ISSN 2006-98.*

[5] Emere, M. C. and Egbe, N.E.L. (2006).Parasites of Synodontisclarias (A Fresh Water Fish). Best Journal 3(3):58-64.

[6] Ezenwaji, N. E., Aguigwo, J. N. I., Philip, C. O. and Ezenwaji, H. M. G. (2005). Helminthendo-parasites of mochokids in a tropical rainforest river system. *Animal Research International (2005) 2(2): 346 – 352*

[7] Ibiwoye .T.I.I., balogun M.A, ogunsiyi R.A, Agbontale J.J (2004). Determination of the infection density of mud fish eustrongylides in *clariasgariepinus* and *clariasangullaries* from bida flood plain of *Nigeria .appl. sci. environ* 8(2): 39-44.

[8] Karoline R., Serge M., Pauel H., Sona T., Martin F., and Andrea Simkova (2011). Are fish immune system really affected by parasites? An immunoecological study of Common Carp (Cyprinus Carpio). Parasites and vectors 4:120. http;//parasites and vectors. Com/content 4/1/120.

[9] Marcogliese, D.J (2002)food webs and the transmission of parasites to marine fish parasitology 124:SB3-599

[10] Olurin K. B and Somorin C.A (2006). Intestinal helminths of the fishes of owa stream, souhwestern Nigeria. J. fishhydrobiol, 1:6-9.

[11] Olurin K, okafor J. Alade A, Asiru R, Ademituwa J, Owonifari K, and Oronaye O. (2012) Helminth parasite of s*arotherodon galilaus* and Tillapiazilli (piscis: cichlidae) from river oshun, southwest Nigeria. *International journal of aquatic science, ISSN.2008-8019, vol. 3. No.2*

[12] Omeji. S., Solomon S. G. and Obande R.A (2010). A comparative study of the common protozoan parasites of *Heterobranchus Longifillis* from the wild and cultured Environment in Benue State. Pakistan *Journal of nutrition* 9(9) : 865-872, 2010, 2680-5194.

[13] Omeji. S. S.G. Solomon and R.A. Obande: A Comparative Study of the Common Protozoan Parasites of *Clariasgariepinus* from the wild and Cultured Environments in Benue State, Nigeria. *Journal of Parasitology Research Volume* 2011(2011).916489.8 pages Doi. 10.1155/2011/9/916489.

[14] Onyeidineke, N.E, Ofoegbu P.U., Ukogo, (2010). Helminth Parasites of Some Freshwater Fish from River. Niger at illushi, Edo State. Nig. J. Am. Sci. 6(3): 16-21 *Pakistan Journal of Nutrition* 9(9) 865-872. 2010. 1680-5194

[15] Paperna, I. (1996). Parasites Infections and Disease of Fishes in Africa. An Update C.F.A Technical Paper. No. 31.

[16] Paul, J.B.H and john, D.R. ,(2002) hand book of fish biology and fisheries , black we publishing, pp: 359-384.

[17] Roberts, L.S. and Janvovy J. (2002). Foundation of Parasitology Boston, Mass, USA: McGraw Hill; 6th Edition International Edition.

[18] Saayman, J.E., Mashego, S. N and Mokgalony, N .M. 1991. Parasites of the fish population with notes on the helminth parasites of the water birds of middle letaba Dam, in a post impoundment ecological study of the middle letaba Dam, Gazankulu, edited by J. E. Saayman, H. J. Schoonbee and G. J. Smit. Pretoria : Department of Development Aid.

[19] Sterud E. Simolin P., and Kvellested A. (2003). Infection by Pervicapsula Sp. (Myxozoa) is associated with mortality in Seacaged Alantic Salmon Salar in Northern Norway. Disease of Aquatic Organisms 54(3):259-63.